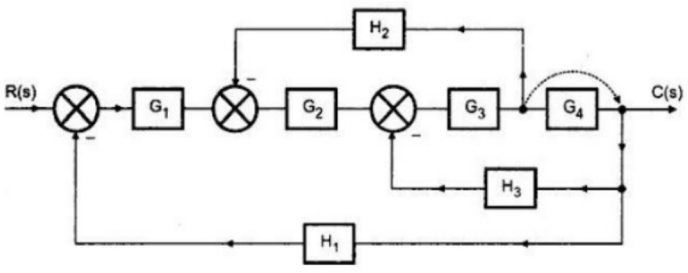
SVKM's
D. J. Sanghvi College of Engineering

Program: B.Tech in Mechanical Engineering **Academic Year: 2022** **Duration: 3 hours**
Date: 12.01.2023
Time: 10:30 am to 01:30 pm
Subject: Industrial Electronics and Controls (Semester V) **Marks: 75**

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover page of the Answer Book, which is provided for their use.

(1) This question paper contains two pages.
(2) Answer to each new question is to be started on a fresh page.
(3) Figures in the brackets on the right indicate full marks.
(4) Assume suitable data wherever required, but justify it.
Draw the neat labelled diagrams, wherever necessary

Question No.		Max. Marks
Q1 (a)	Circuit diagram and view forms explain 180-degree mode of conduction for a 3-phase bridge inverter circuit **OR** Explain V-I characteristics for SCR with three modes of operation. Define latching and holding current	[10] [10]
Q1 (b)	Explain methods to turn on SCR	[05]
Q2 (a)	How speed of AC motor can be controlled by inverter circuit. Explain with suitable block diagram **OR** Describe the working principle of the BLDC motor with a neat, labelled Diagram	[10] [10]
Q2 (b)	Write a note on the working principle of the Servo Motor with a neat diagram **OR** Derive torque equation for Dc motor	[05] [05]
Q3 (a)	Obtain Transfer function C(S)/R(S) using block reduction Technique 	[10]

	OR Derive Expressions for Errors for all 3 different types of systems if applied with 3 different types of Inputs	[10]
Q3 (b)	The system is given as under $G(S)H(S)= K / s^2(s+2)(s+3)$ 1. Find the Type of the system 2. Error while the input is $1+20t^2$ OR Write shortnote on PID	[05] [05]
Q4 (a)	By drawing Root locus kindly comment on stability for the system given under: $G(s) = k / s(s+1)(s+3)(s+2)$ **OR** Examine the stability by Rouths criteria $S^4+10s^3+35s^2+50s+24=0$	[10] [10]
Q4 (b)	Derive an expression for T.F. for simple closed loop system **OR** Distinguish between open loop and closed loop system.	[05] [05]
Q5 (a)	Discuss the role played by following four elements in a PLC: (i) Input module (ii) Memory (iii) CPU (iv) Power supply **OR** Write a short note on SCR an its application	[10] [10]
Q5 (b)	Write a short note on Logic gates along with their applications. **OR** Write a short note on PLC.	[05] [05]